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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/590,213

08/22/2006

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Q96593

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23373 7590 07/20/2009  
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EXAMINER

DINH, THAI T

ART UNIT

PAPER NUMBER

2837

MAIL DATE

DELIVERY MODE

07/20/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/590,213	<b>Applicant(s)</b> KOBAYASHI, HIDEYUKI	
	<b>Examiner</b> THAI DINH	<b>Art Unit</b> 2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-15 is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 4-9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/22/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to because Figs. 5, 6 and 7 show outputs of multiplexers 10c and 10f including compensated current values  $Kd'Id$ ,  $Kw'Kd'Id$  and  $Kq'Kd'Id$  which should be  $Kd'Ic$ ,  $Kw'Kd'Ic$  and  $Kq'Kd'Ic$ , respectively – see lines 15 and 20, page 8. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2837

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant acknowledged prior art Figs. 1-2 in view of Matsui et al. (hereinafter Matsui, US 6,329,781 B1).

For claim 1, Figs. 1- 2 of the prior art teach all the claim elements and supported by applicant's specification (see paragraph [0002] through paragraph [0017]).

Fig. 2 of prior art teaches a control apparatus of an electric power steering apparatus (see paragraph [0023]) comprising:

a motor (Figs. 1-2 of prior art disclose a motor 108) applying a steering assist force to a steering system of a vehicle (see paragraph [0003], lines 6-8); and

A current command value calculating means (Fig. 2 of prior art discloses a current command value calculating means 204) for calculating a q-axis current command value  $I_{qref}$  controlling an output torque of the motor and a d-axis current command value  $I_{dref}$  controlling a magnetic field of the motor (see paragraph [0005]). Prior art does not show a current command value correcting means for calculating a corrected q-axis current command value  $I_{qc}$  obtained by correcting the q-axis current command value  $I_{qref}$  on the basis of a Rotor position  $\theta$  of the motor, and controls the motor on the basis of the corrected q-axis current command value  $I_{qc}$ . However, Figs. 1-2 of Matsui teach a current command value correcting means (Fig. 1 of Matsui discloses a current command value correcting means 90 which is constituted by searching means 201 and correction means 202 as shown in Fig. 2 of Matsui) for

Art Unit: 2837

calculating a corrected q-axis current command value  $I_{qc}$  obtained by correcting the q-axis current command value  $I_{qref}$  (Figs 1-2 of Matsui disclose a corrected q-axis current command value  $I_{q*}$ ) on the basis of a rotor position  $\theta$  of the motor ( Fig. 1 of Matsui disclose a corrected q-axis current command value  $I_{q*}$  which is based on a rotational speed  $N$  received from the speed detection unit 6 for detecting a speed on the basis of an output of a resolver 14 -- see col. 4, lines 35-39 and 3-9), and controls the motor on the basis of the corrected q-axis current command value  $I_{qc}$  (see col. 4, lines 43-65). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to modify control apparatus to correct the q-axis current command value  $I_{qref}$  on the basis of a rotor position  $\theta$  in Fig. 2 of prior art by using a current command value correcting means 90 for calculating a corrected q-axis current command value  $I_{q*}$  as taught in Figs 1-2 of Matsui for purpose to output a desired torque at a desired rotation speed without a risk of for example damaging the apparatus.

For claim 2, combination between Fig. 2 of prior art and Figs. 1-2 of Matsui teaches a control apparatus of an electric power steering apparatus as claimed in claim 1, wherein the current command value correcting means (Fig. 1 of Matsui teaches the current command value correcting means 90) calculates the corrected q-axis current command value  $I_{qc}$  (Figs. 1-2 of Matsui disclose the corrected q-axis current command value  $I_{q*}$ ) obtained by correcting the q-axis current command value  $I_{qref}$  on the basis of the rotor position  $\theta$  of the motor and an angular velocity  $w$  of the rotor (Fig. 2 of prior art discloses the q-axis current command value  $I_{qref}$  on the basis of the rotor position  $\theta$  of

Art Unit: 2837

the motor 108 and an angular velocity  $w$  of the rotor --see paragraph [0005] in applicant's specification).

For claim 3, combination between Fig. 2 of prior art and Figs. 1-2 of Matsui teaches a control apparatus of an electric power steering apparatus as claimed in claim 1, wherein the current command value correcting means (Fig. 1 of Matsui teaches the current command value correcting means 90) calculates the corrected q-axis current command value  $I_{qc}$  (Figs. 1-2 of Matsui disclose the corrected q-axis current command value  $I_q^*$ ) obtained by correcting the q-axis current command value  $I_{qref}$  on the basis of the rotor position  $\theta$  of the motor (Fig. 2 of prior art discloses the q-axis current command value  $I_{qref}$  on the basis of the rotor position  $\theta$  of the motor 108 --see paragraph [0005] in applicant's specification) and the q-axis current value  $I_{qref}$  (Albeit not shown  $I_{qref}$  in Fig. 2 of Matsui. It is obvious that the corrected q-axis current command value  $I_q^*$  obtained by correcting the q-axis current command value  $I_{qref}$  on the basis of the q-axis current value  $I_{qref}$  because in system of Matsui, the current command determination unit 9 which has inputs torque command  $\tau^*$  and rational speed  $N$  from speed detection unit 6; and output corrected q-axis current command value  $I_q^*$  is similar with modified circuit in Fig. 2 of prior art by connecting block 204 in Fig. 2 of prior art to current command value correcting means 90 in system of Matsui).

***Allowable Subject Matter***

3. Claims 4-9 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Art Unit: 2837

4. Claims 10-15 are allowable.

5. The following is a statement of reasons for the indication of allowable subject matter:

For claim 4, none of the prior art of record teaches a control apparatus of an electric power steering apparatus including a current command value correcting means which is used to calculate the corrected q-axis current command value by adding a basic correcting current  $I_c$  previously determined by the rotor position  $\theta$  to the q-axis current command value in combination with the rest of limitations in the claim.

Claims 5-7 have the same reasons for allowance as claim 4 with a control apparatus of an electric power steering apparatus including a various types of correcting means as recited in the dependent claims 5-7 and 13-15.

Claims 8-9 are allowed because they depend on claim 7.

For claim 10, none of the prior art of record teaches a control apparatus of an electric power steering apparatus including a current command value correcting means which calculates a corrected q-axis current command value obtained by correcting the q-axis current command value on the basis of a rotor position of the motor and the d-axis current command value, and controls the motor on the basis of the corrected q-axis current command value in combination with the rest of limitations in the claim.

Claims 11-15 are allowed because they depend on claim 10.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

Art Unit: 2837

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to THAI DINH whose telephone number is (571)270-3852. The examiner can normally be reached on 7:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WALTER BENSON can be reached on (571)272-2227. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/THAI DINH/  
Examiner, Art Unit 2837

/BENTSU RO/  
Primary Examiner, Art Unit 2837